SEQUENCE LISTING

<110> TANOX, INC.
FUNG, Sek Chung
SINGH, Sanjaya
HUANG, Dan
Moyle, Matthew
LU, Mason
YAN, Changning

<120> Anti-IL13 Antibodies and Uses Thereof

<130> TNX-1050

<150> US60/532,130
<151> 2003-12-23

<160> 152

<170> PatentIn version 3.2

<210> 1
<211> 114
<212> PRT
<213> Homo sapiens

<400> 1

Ser Pro Gly Pro Val Pro Pro Ser Thr Ala Leu Arg Glu Leu Ile Glu
1 5 10 15

Glu Leu Val Asn Ile Thr Gln Asn Gln Lys Ala Pro Leu Cys Asn Gly
20 25 30

Ser Met Val Trp Ser Ile Asn Leu Thr Ala Gly Met Tyr Cys Ala Ala
35 40 45

Leu Glu Ser Leu Ile Asn Val Ser Gly Cys Ser Ala Ile Glu Lys Thr
50 55 60

Gln Arg Met Leu Ser Gly Phe Cys Pro His Lys Val Ser Ala Gly Gln
65 70 75 80

Phe Ser Ser Leu His Val Arg Asp Thr Lys Ile Glu Val Ala Gln Phe
85 90 95

Val Lys Asp Leu Leu Leu His Leu Lys Lys Leu Phe Arg Glu Gly Arg
100 105 110

Phe Asn

<210> 2
<211> 114
<212> PRT
<213> Homo sapiens

<220>
<221> misc_feature
<222> (13)..(13)

<223> Xaa can be any naturally occurring amino acid

<400> 2

Ser Pro Gly Pro Val Pro Pro Ser Thr Ala Leu Arg Xaa Leu Ile Glu
1 5 10 15

Glu Leu Val Asn Ile Thr Gln Asn Gln Lys Ala Pro Leu Cys Asn Gly
20 25 30

Ser Met Val Trp Ser Ile Asn Leu Thr Ala Gly Met Tyr Cys Ala Ala
35 40 45

Leu Glu Ser Leu Ile Asn Val Ser Gly Cys Ser Ala Ile Glu Lys Thr
50 55 60

Gln Arg Met Leu Ser Gly Phe Cys Pro His Lys Val Ser Ala Gly Gln
65 70 75 80

Phe Ser Ser Leu His Val Arg Asp Thr Lys Ile Glu Val Ala Gln Phe
85 90 95

Val Lys Asp Leu Leu Leu His Leu Lys Lys Leu Phe Arg Glu Gly Arg
100 105 110

Phe Asn

<210> 3
<211> 113
<212> PRT
<213> Murinae gen. sp.

<220>
<221> CHAIN
<222> (1)..(113)
<223> VARIABLE REGION OF LIGHT CHAIN OF MONOCLONAL ANTIBODY 228B/C

<400> 3

Asn Ile Val Leu Thr Gln Ser Pro Ala Ser Leu Ala Val Ser Leu Gly
1 5 10 15

Gln Arg Ala Thr Ile Ser Cys Arg Ala Ser Lys Ser Val Asp Ser Tyr
20 25 30

Gly Asn Ser Phe Met His Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro
35 40 45

Lys Leu Leu Ile Tyr Leu Ala Ser Asn Leu Glu Ser Gly Val Pro Ala
50 55 60

Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr Leu Thr Ile Asp
65 70 75 80

Pro Val Glu Ala Asp Asp Ala Ala Ser Tyr Tyr Cys Gln Gln Asn Asn
85 90 95

Glu Asp Pro Arg Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg
100 105 110

Ala

<210> 4
<211> 118
<212> PRT
<213> Murinae gen. sp.

<220>
<221> CHAIN
<222> (1)..(118)
<223> VARIABLE REGION OF HEAVY CHAIN OF MONOCLONAL ANTIBODY 228B/C

<400> 4

Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Ala Pro Ser Gln
1 5 10 15

Ser Leu Ser Ile Thr Cys Thr Val Ser Gly Phe Ser Leu Asn Ala Tyr
20 25 30

Ser Val Asn Trp Val Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp Leu
35 40 45

Gly Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Lys
50 55 60

Ser Arg Leu Asn Ile Ser Lys Asp Ser Ser Lys Ser Gln Val Phe Leu
65 70 75 80

Lys Met Ser Ser Leu Gln Ser Asp Asp Thr Ala Arg Tyr Tyr Cys Ala
85 90 95

Gly Asp Gly Tyr Tyr Pro Tyr Ala Met Asp Asn Trp Gly His Gly Thr
100 105 110

Ser Val Thr Val Ser Ser
115

<210> 5
<211> 118
<212> PRT
<213> Murinae gen. sp.

<220>
<221> CHAIN
<222> (1)..(118)
<223> VARIABLE REGION OF LIGHT CHAIN OF MONOCLONAL ANTIBODY 228A-4

<400> 5

Gln Val Gln Leu Lys Glu Ser Gly Pro Gly Leu Val Ala Pro Ser Gln
1 5 10 15

Ser Leu Ser Ile Thr Cys Thr Val Ser Gly Phe Ser Leu Thr Asp Tyr
20 25 30

Asn Ile Asn Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp Leu
35 40 45

Gly Met Ile Trp Gly Asp Gly Ser Thr Ala Tyr Asn Ser Ala Leu Lys
50 55 60

Ser Arg Leu Ser Ile Ser Lys Asp Asn Ser Lys Ser Gln Ile Phe Leu
65 70 75 80

Lys Met Asn Ser Leu Gln Thr Glu Asp Thr Ala Arg Tyr Tyr Cys Ala
85 90 95

Arg Asp Gly Tyr Phe Pro Tyr Ala Met Ala Tyr Trp Gly Gln Gly Thr
100 105 110

Ser Val Thr Val Ser Ser
115

<210> 6
<211> 118
<212> PRT
<213> Murinae gen. sp.

<220>
<221> CHAIN
<222> (1)..(118)
<223> VARIABLE REGION OF HEAVY CHAIN OF MONOCLONAL ANTIBODY 228A-4

<400> 6

Gln Val Gln Leu Lys Glu Ser Gly Pro Gly Leu Val Ala Pro Ser Gln
1 5 10 15

Ser Leu Ser Ile Thr Cys Thr Val Ser Gly Phe Ser Leu Thr Asp Tyr
20 25 30

Asn Ile Asn Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp Leu
35 40 45

Gly Met Ile Trp Gly Asp Gly Ser Thr Ala Tyr Asn Ser Ala Leu Lys
50 55 60

Ser Arg Leu Ser Ile Ser Lys Asp Asn Ser Lys Ser Gln Ile Phe Leu
65 70 75 80

Lys Met Asn Ser Leu Gln Thr Glu Asp Thr Ala Arg Tyr Tyr Cys Ala
85 90 95

g Asp Gly Tyr Phe Pro Tyr Ala Met Ala Tyr Trp Gly Gln Gly Thr
100 105 110

er Val Thr Val Ser Ser
115

<210> 7
<211> 114
<212> PRT
<213> Murinae gen. sp.

<220>
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<222> (1)..(114)
<223> VARIABLE REGION OF LIGHT CHAIN OF MONOCLONAL ANTIBODY 227-26

<220>
<221> CHAIN
<222> (1)..(114)
<223> VARIABLE REGION OF LIGHT CHAIN OF MONOCLONAL ANTIBODY 227-26-1

<400> 7

Asp Val Leu Met Thr Gln Thr Pro Leu Ser Leu Pro Val Ser Leu Gly
1 5 10 15

Asp Gln Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Ile Val His Ser
20 25 30

Asn Gly Asn Thr Tyr Leu Gln Trp Tyr Leu Gln Lys Pro Gly Gln Ser
35 40 45

Pro Lys Leu Leu Ile Tyr Lys Val Ser Asn Arg Phe Ser Gly Val Pro
50 55 60

Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile
65 70 75 80

Ser Arg Val Glu Ala Glu Asp Leu Gly Val Tyr Tyr Cys Phe Gln Gly
85 90 95

Ser His Val Pro Tyr Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys
100 105 110

Arg Ala

<210> 8
<211> 120
<212> PRT
<213> Murinae gen. sp.

<220>
<221> CHAIN
<222> (1)..(120)
<223> VARIABLE REGION OF HEAVY CHAIN OF MONOCLONAL ANTIBODY 227-26-1

<400> 8

Gln Val Gln Leu Gln Gln Ser Gly Asp Asp Leu Val Leu Pro Gly Ala
1 5 10 15

Ser Val Lys Leu Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Ser Tyr
20 25 30

Trp Ile Asn Trp Ile Lys Gln Arg Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly His Ile Ala Pro Gly Ser Gly Ser Thr Tyr Phe Asn Glu Met Phe
50 55 60

Lys Gly Lys Ala Thr Leu Thr Val Asp Thr Ser Ser Ser Thr Ala Tyr
65 70 75 80

Ile Gln Leu Ser Ser Leu Ser Ser Glu Asp Ser Ala Val Tyr Phe Cys
85 90 95

Ala Arg Ser Asp Ile Phe Leu Ser Tyr Ala Met Asp Tyr Trp Gly Gln
100 105 110

Gly Thr Ser Val Thr Val Ser Ser
115 120

<210> 9
<211> 50
<212> DNA
<213> ARTIFICIAL

<220>
<223> Forward oligonucleotide primer for a mutant IL13 sequence

<400> 9
aagctttccc caggccctgt gcctccctct acagccctca ggaagctcat 50

<210> 10
<211> 30
<212> DNA
<213> ARTIFICIAL

<220>
<223> Reverse Oligo nucleotide primer of a mutant IL13 sequence

<400> 10
ctcgaggttg aaccgtccct cgcgaaaaag 30

<210> 11
<211> 22
<212> DNA
<213> ARTIFICIAL

<220>
<223> Forward degenerate oligonucleotide primer for monkey IL13

<400> 11
gyyctrggcy ycatggcgct yt 22

<210> 12
<211> 25
<212> DNA
<213> ARTIFICIAL

<220>
<223> Reverse degenerate oligonucleotide primer for monkey IL13

<400> 12
tttcagttga accgtccyty gcgaa 25

<210> 13
<211> 399
<212> DNA
<213> Macaca fascicularis

<400> 13
atggcgctct tgttgaccat ggtcattgct ctcacttgcc tcggcggctt tgcctcccca 60

agccctgtgc ctccctctac agccctcaag gagctcattg aggagctggt caacatcacc 120

cagaaccaga aggccccgct ctgcaatggc agcatggtgt ggagcatcaa cctgacagct 180

ggcgtgtact gtgcagccct ggaatccctg atcaacgtgt caggctgcag tgccatcgag 240

aagacccaga ggatgctgaa cggattctgc ccgcacaagg tctcagctgg gcagttttcc 300

agcttgcgtg tccgagacac caaaatcgag gtggcccagt ttgtaaagga cctgctcgta 360

catttaaaga aacttttcg caatggacgg ttcaactga 399

<210> 14
<211> 34
<212> DNA
<213> ARTIFICIAL

<220>
<223> Forward oligonucleotide primer for cynomologus monkey IL13

<400> 14
aagcttcacc atggcgctct tgttgaccat ggtc 34

<210> 15
<211> 40
<212> DNA
<213> ARTIFICIAL

<220>
<223> Reverse oligonucleotide primer for cynomologus monkey IL13

<400> 15
tcacaagatc tgggctcctc gaggttgaac cgtccattgc 40

<210> 16
<211> 23
<212> DNA
<213> ARTIFICIAL

<220>
<223> Forward oligonucleotide primer for Fc gamma1

<400> 16
ctcgaggagc ccagatcttg tga 23

<210> 17
<211> 35
<212> DNA
<213> ARTIFICIAL

<220>
<223> Reverse oligonucleotide primer for Fc gamma 1

<400> 17
gctctagagc ctcatttacc cggagacagg gagag 35

<210> 18
<211> 8
<212> PRT
<213> ARTIFICIAL

<220>
<223> EPITOPE BINDING SITE

<400> 18

Glu Ser Leu Ile Asn Val Ser Gly
1 5

<210> 19
<211> 12
<212> PRT
<213> ARTIFICIAL

<220>
<223> EPITOPE BINDING SITE

<400> 19

Tyr Cys Ala Ala Leu Glu Ser Leu Ile Asn Val Ser
1 5 10

<210> 20
<211> 23
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRL1 228B/C-1

<400> 20

Asn Ile Val Leu Thr Gln Ser Pro Ala Ser Leu Ala Val Ser Leu Gly
1 5 10 15

Gln Arg Ala Thr Ile Ser Cys
20

<210> 21
<211> 23
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRL1 TEMPLATE HT2

<400> 21

Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ser Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys
20

<210> 22
<211> 23
<212> PRT
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<220>
<223> FRL1 VARIANT B

<400> 22

Asp Ile Val Met Thr Gln Ser Pro Ala Ser Leu Ala Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys
20

<210> 23
<211> 23
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRL1 VARIANT J

<400> 23

Asp Ile Val Leu Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys
20

<210> 24
<211> 23
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRL1 VARIANT L

<400> 24

Asp Ile Val Leu Thr Gln Ser Pro Ala Ser Leu Ser Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys
20

<210> 25
<211> 23
<212> PRT
<213> ARTIFICIAL

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<223> FRL1 VARIANT HT-NEW #300

<400> 25

Asp Ile Val Leu Thr Gln Ser Pro Asp Ser Leu Ser Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys
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<210> 26
<211> 23
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRL1 VARIANT HT2-DP27 #29

<400> 26

Asp Ile Val Leu Thr Gln Ser Pro Val Ser Leu Ala Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys
20

<210> 27
<211> 23
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRL1 VARIANT HT2-DP27 #53

<400> 27

Asp Ile Val Met Thr Gln Ser Pro Ala Ser Leu Ser Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys
20

<210> 28
<211> 23
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRL1 VARIANT HT2-DP27 #66

<400> 28

Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys
20

<210> 29
<211> 15
<212> PRT

<213> ARTIFICIAL

<220>
<223> FRL2 228B/C

<400> 29

Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro Lys Leu Leu Ile Tyr
1 5 10 15

<210> 30
<211> 32
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRL3 288 B/C

<400> 30

Gly Val Pro Ala Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Asp Pro Val Glu Ala Asp Asp Ala Ala Ser Tyr Tyr Cys
20 25 30

<210> 31
<211> 32
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRL3 HT2

<400> 31

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 32
<211> 32
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRL3 VARIANT B

<400> 32

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Asp Pro Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 33
<211> 32
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRL3 VARIANT J

<400> 33

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Asp Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 34
<211> 32
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRL3 VARIANT L

<400> 34

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Asp Pro Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 35
<211> 32
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRL3 VARIANT N

<400> 35

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Asp Pro Val Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 36
<211> 32
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRL3 VARIANT P

<400> 36

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Asp Ser Val Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 37

<211> 32
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRL3 VARIANT R

<400> 37

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Ser Ser Val Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 38
<211> 32
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<223> FRL3 VARIANT HT2-NEW #1

<400> 38

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Ser Pro Val Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 39
<211> 32
<212> PRT
<213> ARTIFICIAL

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<223> FRL3 VARIANT HT2-NEW #9

<400> 39

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Ser Ser Val Glu Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 40
<211> 32
<212> PRT
<213> ARTIFICIAL

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<223> FRL3 VARIANT HT2-NEW #14

<400> 40

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Ser Pro Val Glu Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 41
<211> 32
<212> PRT
<213> ARTIFICIAL

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<400> 41

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Ser Ser Val Glu Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 42
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<213> ARTIFICIAL

<220>
<223> FRL3 VARIANT HT2-NEW # 67

<400> 42

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Asp Pro Leu Glu Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 43
<211> 32
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRL3 VARIANT HT2-NEW #74

<400> 43

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Ser Pro Val Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 44
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<212> PRT
<213> ARTIFICIAL

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<400> 44

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Asp Ser Val Glu Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 45
<211> 32
<212> PRT
<213> ARTIFICIAL

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<400> 45

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Asp Ser Leu Glu Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 46
<211> 32
<212> PRT
<213> ARTIFICIAL

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<223> FRL3 VARIANT HT2-NEW #162

<400> 46

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Asp Pro Val Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 47
<211> 32
<212> PRT
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<400> 47

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Asp Ser Val Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 48
<211> 32
<212> PRT
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<223> FRL3 VARIANT HT2-DP27 #57

<400> 48

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Ser Pro Val Glu Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 49
<211> 32
<212> PRT
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<223> FRL3 VARIANT HT2-DP27 #73

<400> 49

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Asp Pro Val Glu Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 50
<211> 32
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRL3 VARIANT HT2-DP27 #92

<400> 50

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Asp Thr Val Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 51
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<220>
<223> FRL3 VARIANT HT2-DP27 #118

<400> 51

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Ser Pro Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 52
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<212> PRT
<213> ARTIFICIAL

<220>
<223> FRL3 VARIANT HT2-DP27 #123

<400> 52

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Ser Ser Leu Glu Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 53
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<212> PRT
<213> ARTIFICIAL

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<223> FRL3 VARIANT HT2-DP27 #83

<400> 53

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Asp Pro Leu Glu Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 54
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<220>
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<400> 54

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Ser Ser Leu Glu Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 55
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<220>
<223> FRL3 VARIANT HT2-DP27 #273

<400> 55

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Ser Ser Val Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 56
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<212> PRT
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<400> 56

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Ser Pro Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 57
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<223> FRL4 228 B/C

<400> 57

Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg Ala
1 5 10

<210> 58
<211> 11
<212> PRT
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<400> 58

Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg
1 5 10

<210> 59
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<400> 59

Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg
1 5 10

<210> 60
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<220>
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<400> 60

Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Ala Pro Ser Gln
1 5 10 15

Ser Leu Ser Ile Thr Cys Thr Val Ser Gly Phe Ser Leu Asn
20 25 30

<210> 61
<211> 30
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRH1 DP27

<400> 61

Gln Val Thr Leu Arg Glu Ser Gly Pro Ala Leu Val Lys Pro Thr Gln
1 5 10 15

Thr Leu Thr Leu Thr Cys Thr Phe Ser Gly Phe Ser Leu Ser
20 25 30

<210> 62
<211> 30
<212> PRT
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<220>
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<400> 62

Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Arg Pro Ser Gln
1 5 10 15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Ser Thr Phe Ser
20 25 30

<210> 63
<211> 30
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRH1 VARIANT HT2-NEW #73

<400> 63

Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Arg Pro Ser Gln
1 5 10 15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Ser Thr Phe Ser
20 25 30

<210> 64
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<212> PRT
<213> ARTIFICIAL

<220>
<223> FRH1 HT2-DP27 #7

<400> 64

Gln Val Thr Leu Arg Glu Ser Gly Pro Ala Leu Val Lys Pro Thr Gln
1 5 10 15

Thr Leu Thr Leu Thr Cys Thr Val Ser Gly Phe Ser Leu Asn
20 25 30

<210> 65
<211> 30
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRH1 VARIANT HT2-DP27 #40

<400> 65

Gln Val Thr Leu Arg Glu Ser Gly Pro Ala Leu Val Lys Pro Thr Gln
1 5 10 15

Thr Leu Thr Leu Thr Cys Thr Val Ser Gly Phe Ser Leu Ser
20 25 30

<210> 66
<211> 30
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRH1 VARIANT HT2-DP27 #268

<400> 66

Gln Val Thr Leu Arg Glu Ser Gly Pro Ala Leu Val Lys Pro Thr Gln
1 5 10 15

Thr Leu Thr Leu Thr Cys Thr Phe Ser Gly Phe Ser Leu Asn
20 25 30

<210> 67
<211> 14
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRH2 228 B/C

<400> 67

Trp Val Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp Leu Gly
1 5 10

<210> 68
<211> 14
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRH2 DP27

<400> 68

Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu Trp Leu Ala

1 5 10

<210> 69
<211> 14
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRH2 NEW

<400> 69

Trp Val Arg Gln Pro Pro Gly Arg Gly Leu Glu Trp Ile Gly
1 5 10

<210> 70
<211> 14
<212> PRT
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<220>
<223> FRH2 VARIANT 1

<400> 70

Trp Val Arg Gln Pro Pro Gly Lys Ala Leu Glu Trp Leu Gly
1 5 10

<210> 71
<211> 14
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRH2 VARIANT 3

<400> 71

Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp Leu Gly
1 5 10

<210> 72
<211> 14
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRH2 VARIANT HT2-DP27 #7

<400> 72

Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu Trp Leu Gly
1 5 10

<210> 73
<211> 14
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRH2 VARIANT HT2-DP27 # 43

<400> 73

Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp Leu Ala
1 5 10

<210> 74
<211> 14
<212> PRT
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<220>
<223> FRH2 VARIANT HT2-DP27 #50

<400> 74

Trp Val Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp Leu Ala
1 5 10

<210> 75
<211> 14
<212> PRT
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<220>
<223> FRH2 VARIANT HT2-DP27 #100

<400> 75

Trp Val Arg Gln Pro Pro Gly Lys Ala Leu Glu Trp Leu Ala
1 5 10

<210> 76
<211> 32
<212> PRT
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<220>
<223> FRH3 228 B/C

<400> 76

Arg Leu Asn Ile Ser Lys Asp Ser Ser Lys Ser Gln Val Phe Leu Lys
1 5 10 15

Met Ser Ser Leu Gln Ser Asp Asp Thr Ala Arg Tyr Tyr Cys Ala Gly
20 25 30

<210> 77
<211> 32
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRH3 DP27

<400> 77

Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu Thr
1 5 10 15

Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala Arg
20 25 30

<210> 78

<211> 32
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRH3 NEW

<400> 78

Arg Val Thr Met Leu Lys Asp Thr Ser Lys Asn Gln Phe Ser Leu Arg
1 5 10 15

Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala Arg
20 25 30

<210> 79
<211> 32
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRH3 VARIANT 1

<400> 79

Arg Leu Thr Ile Ser Lys Asp Ser Ser Lys Asn Gln Val Val Leu Thr
1 5 10 15

Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala Gly
20 25 30

<210> 80
<211> 32
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRH3 VARIANT 3

<400> 80

Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu Thr
1 5 10 15

Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala Gly
20 25 30

<210> 81
<211> 32
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRH3 VARIANT 4

<400> 81

Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu Thr
1 5 10 15

Met Thr Asn Met Asp Pro Val Asp Thr Ala Arg Tyr Tyr Cys Ala Gly
20 25 30

<210> 82
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<212> PRT
<213> ARTIFICIAL

<220>
<223> FRH3 HT2-NEW #1

<400> 82

Arg Leu Asn Met Ser Lys Asp Thr Ser Lys Asn Gln Phe Phe Leu Arg
1 5 10 15

Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala Gly
20 25 30

<210> 83
<211> 32
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRH3 VARIANT HT2-NEW #9

<400> 83

Arg Leu Asn Met Ser Lys Asp Thr Ser Lys Asn Gln Phe Phe Leu Arg
1 5 10 15

Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Arg Tyr Tyr Cys Ala Gly
20 25 30

<210> 84
<211> 32
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRH3 VARIANT HT2-NEW #14

<400> 84

Arg Val Asn Met Ser Lys Asp Thr Ser Lys Asn Gln Phe Ser Leu Arg
1 5 10 15

Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala Arg
20 25 30

<210> 85
<211> 32
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRH3 VARIANT HT2-DP27 #26

<400> 85

Arg Leu Asn Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu Thr
1 5 10 15

Met Thr Asn Met Asp Pro Val Asp Thr Ala Arg Tyr Tyr Cys Ala Arg
20 25 30

<210> 86
<211> 32
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRH3 VARIANT HT2-DP27 #275

<400> 86

Arg Leu Thr Ile Ser Lys Asp Ile Ser Lys Asn Gln Val Val Leu Thr
1 5 10 15

Met Thr Asn Met Asp Pro Val Asp Thr Ala Arg Tyr Tyr Cys Ala Gly
20 25 30

<210> 87
<211> 32
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRH3 VARIANT HT2-DP27 #301

<400> 87

Arg Leu Asn Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu Thr
1 5 10 15

Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala Gly
20 25 30

<210> 88
<211> 32
<212> PRT
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<220>
<223> FRH3 VARIANT HT2-DP27 #580

<400> 88

Arg Leu Asn Ile Ser Lys Asp Ser Ser Lys Asn Gln Val Val Leu Thr
1 5 10 15

Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala Gly
20 25 30

<210> 89
<211> 32
<212> PRT
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<220>
<223> FRH3 VARIANT HT2-DP27 #345

<400> 89

Arg Leu Asn Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu Thr
1 5 10 15

Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala Arg
20 25 30

<210> 90
<211> 32
<212> PRT
<213> ARTIFICIAL

<220>
<223> FRH3 VARIANT HT2-DP27 #634

<400> 90

Arg Leu Thr Ile Ser Lys Asp Ser Ser Lys Asn Gln Val Val Leu Thr
1 5 10 15

Met Thr Asn Met Asp Pro Val Asp Thr Ala Arg Tyr Tyr Cys Ala Gly
20 25 30

<210> 91
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<212> PRT
<213> ARTIFICIAL

<220>
<223> FRH4 228B/C

<400> 91

Trp Gly His Gly Thr Ser Val Thr Val Ser Ser
1 5 10

<210> 92
<211> 11
<212> PRT
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<220>
<223> FRH4 DP27

<400> 92

Trp Gly Gln Gly Ser Leu Val Thr Val Ser Ser
1 5 10

<210> 93
<211> 112
<212> PRT
<213> ARTIFICIAL

<220>
<223> VARIABLE LIGHT CHAIN OF CL5

<400> 93

Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ser Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys Arg Ala Ser Lys Ser Val Asp Ser Tyr

20 25 30

Gly Gln Ser Phe Met His Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro
35 40 45

Lys Leu Leu Ile Tyr Leu Ala Ser Asn Leu Glu Ser Gly Val Pro Asp
50 55 60

Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser
65 70 75 80

Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln Asn Ala
85 90 95

Glu Asp Pro Arg Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg
100 105 110

<210> 94
<211> 118
<212> PRT
<213> ARTIFICIAL

<220>
<223> VARIABLE HEAVY CHAIN OF CL5

<400> 94

Gln Val Thr Leu Arg Glu Ser Gly Pro Ala Leu Val Lys Pro Thr Gln
1 5 10 15

Thr Leu Thr Leu Thr Cys Thr Gly Ser Gly Phe Ser Leu Ser Ala Tyr
20 25 30

Ser Val Asn Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu Trp Leu
35 40 45

Ala Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Lys
50 55 60

Ser Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu
65 70 75 80

Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala
85 90 95

Val Asp Gly Tyr Tyr Pro Tyr Ala Met Lys Asn Trp Gly Gln Gly Ser
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 95
<211> 112
<212> PRT
<213> ARTIFICIAL

<220>
<223> VARIABLE LIGHT CHAIN OF CL-13

<400> 95

Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ser Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys Arg Ala Ser Lys Ser Val Asp Ser Tyr
20 25 30

Gly Gln Ser Phe Met His Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro
35 40 45

Lys Leu Leu Ile Tyr Leu Ala Ser Asn Leu Glu Ser Gly Val Pro Asp
50 55 60

Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser
65 70 75 80

Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln Asn Asn
85 90 95

Glu Asp Pro Arg Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg
100 105 110

<210> 96
<211> 118
<212> PRT
<213> ARTIFICIAL

<220>
<223> VARIABLE HEAVY CHAIN OF CL-13

<400> 96

Gln Val Thr Leu Arg Glu Ser Gly Pro Ala Leu Val Lys Pro Thr Gln
1 5 10 15

Thr Leu Thr Leu Thr Cys Thr Gly Ser Gly Phe Ser Leu Ser Ala Lys
20 25 30

Ser Val Asn Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu Trp Leu
35 40 45

Ala Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Lys
50 55 60

Ser Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu
65 70 75 80

Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala
85 90 95

Val Asp Gly Tyr Tyr Pro Tyr Ala Met Ser Asn Trp Gly Gln Gly Ser

100 105 110

Leu Val Thr Val Ser Ser
115

<210> 97
<211> 112
<212> PRT
<213> ARTIFICIAL

<220>
<223> VARIABLE LIGHT CHAIN OF CL-50

<400> 97

Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ser Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys Arg Ala Ser Lys Ser Val Asp Ser Tyr
20 25 30

Gly Gln Ser Phe Met His Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro
35 40 45

Lys Leu Leu Ile Tyr Leu Ala Ser Asn Leu Glu Ser Gly Val Pro Asp
50 55 60

Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser
65 70 75 80

Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln Asn Ala
85 90 95

Glu Asp Pro Arg Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg
100 105 110

<210> 98
<211> 118
<212> PRT
<213> ARTIFICIAL

<220>
<223> VARIABLE HEAVY CHAIN OF CL-50

<400> 98

Gln Val Thr Leu Arg Glu Ser Gly Pro Ala Leu Val Lys Pro Thr Gln
1 5 10 15

Thr Leu Thr Leu Thr Cys Thr Gly Ser Gly Phe Ser Leu Ser Ala Lys
20 25 30

Ser Val Asn Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu Trp Leu
35 40 45

Ala Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Lys
50 55 60

Ser Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu
65 70 75 80

Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala
85 90 95

Val Asp Gly Tyr Tyr Pro Tyr Ala Met Lys Asn Trp Gly Gln Gly Ser
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 99
<211> 15
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-L1 228B/C

<400> 99

Arg Ala Ser Lys Ser Val Asp Ser Tyr Gly Asn Ser Phe Met His
1 5 10 15

<210> 100
<211> 15
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-L1 VARIANT 1

<400> 100

Arg Ala Ser Lys Ser Val Asp Ser Tyr Gly Gln Ser Phe Met His
1 5 10 15

<210> 101
<211> 15
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-L1 VARIANT 2

<400> 101

Arg Ala Ser Lys Ser Val Asp Ser Tyr Gly Gln Ser Phe Leu His
1 5 10 15

<210> 102
<211> 15
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-L1 VARIANT 3

<400> 102

Arg Ala Ser Lys Ser Val Asp Ser Tyr Gly Asn Ser Tyr Met His
1 5 10 15

<210> 103
<211> 15
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-L1 VARIANT 4

<400> 103

Arg Ala Ser Lys Ser Val Asp Ser Tyr Gly Asn Ser Phe Leu His
1 5 10 15

<210> 104
<211> 7
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-L2 228B/C

<400> 104

Leu Ala Ser Asn Leu Glu Ser
1 5

<210> 105
<211> 7
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-L2 VARIANT 1

<400> 105

Leu Ala Ser Asn Leu Asn Ser
1 5

<210> 106
<211> 7
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-L2 VARIANT 2

<400> 106

Leu Ala Ser Asn Leu Gln Ser
1 5

<210> 107
<211> 7
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-L2 VARIANT 3

<400> 107

Leu Ala Thr Asn Leu Glu Ser
1 5

<210> 108
<211> 7
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-L2 VARIANT 4

<400> 108

Leu Ala Ser Asn Leu Lys Ser
1 5

<210> 109
<211> 7
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-L2 VARIANT 5

<400> 109

Leu Ala Ser Asn Leu Glu Lys
1 5

<210> 110
<211> 7
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-L2 VARIANT 6

<400> 110

Leu Ala Ser Arg Leu Glu Ser
1 5

<210> 111
<211> 7
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-L2 VARIANT 7

<400> 111

Leu Ala Ser Asn Leu His Ser
1 5

<210> 112
<211> 7
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-L2 VARIANT 8

<400> 112

Leu Ala Ser Asn Leu Ser Ser
1 5

<210> 113
<211> 7
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-L2 VARIANT 9

<400> 113

Leu Ala Ser Phe Leu Glu Ser
1 5

<210> 114
<211> 7
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-L2 VARIANT 10

<400> 114

Leu Ala Asn Asn Leu Glu Ser
1 5

<210> 115
<211> 9
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-L3 228B/C

<400> 115

Gln Gln Asn Asn Glu Asp Pro Arg Thr
1 5

<210> 116
<211> 9
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-L3 VARIANT 1

<400> 116

Gln Gln Asn Ala Glu Asp Pro Arg Thr
1 5

<210> 117
<211> 5
<212> PRT
<213> ARTIFICIAL

<220>

<223> CDR-H1 228B/C

<400> 117

Ala Tyr Ser Val Asn
1 5

<210> 118
<211> 5
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-H1 VARIANT 1

<400> 118

Ala Lys Ser Val Asn
1 5

<210> 119
<211> 5
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-H1 VARIANT 2

<400> 119

Ala Asn Ser Val Asn
1 5

<210> 120
<211> 5
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-H1 VARIANT 3

<400> 120

Gly Tyr Ser Val Asn
1 5

<210> 121
<211> 5
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-H1 VARIANT 4

<400> 121

Ala His Ser Val Asn
1 5

<210> 122
<211> 5
<212> PRT
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<220>
<223> CDR-H1 VARIANT 5

<400> 122

Ala Arg Ser Val Asn
1 5

<210> 123
<211> 16
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-H2 228B/C

<400> 123

Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Lys Ser
1 5 10 15

<210> 124
<211> 16
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-H2 VARIANT 1

<400> 124

Met Ile Trp Gly Asp Gly Lys Ile Ser Tyr Asn Ser Ala Leu Lys Ser
1 5 10 15

<210> 125
<211> 16
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-H2 VARIANT 2

<400> 125

Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Glu Ser
1 5 10 15

<210> 126
<211> 16
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-H2 VARIANT 3

<400> 126

Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Lys Ser
1 5 10 15

<210> 127
<211> 16
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-H2 VARIANT 4

<400> 127

Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Asp Leu Lys Ser
1 5 10 15

<210> 128
<211> 16
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-H2 VARIANT 5

<400> 128

Met Ile Trp Gly Asp Gly Lys Val Val Tyr Asn Ser Ala Leu Lys Ser
1 5 10 15

<210> 129
<211> 16
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-H2 VARIANT 6

<400> 129

Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Glu Leu Lys Ser
1 5 10 15

<210> 130
<211> 16
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-H2 VARIANT 7

<400> 130

Met Ile Trp Gly Asp Gly Lys Ile Ala Tyr Asn Ser Ala Leu Lys Ser
1 5 10 15

<210> 131
<211> 16
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-H2 VARIANT 8

<400> 131

Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Lys Glu
1 5 10 15

<210> 132
<211> 16
<212> PRT

<213> ARTIFICIAL

<220>
<223> CDR-H2 VARIANT 9

<400> 132

Met Val Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Lys Ser
1 5 10 15

<210> 133
<211> 16
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-H2 VARIANT 10

<400> 133

Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Ala Ser
1 5 10 15

<210> 134
<211> 16
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-H2 VARIANT 11

<400> 134

Met Ile Trp Gly Asp Gly Lys Lys Val Tyr Asn Ser Ala Leu Lys Ser
1 5 10 15

<210> 135
<211> 10
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-H3 228B/C

<400> 135

Asp Gly Tyr Tyr Pro Tyr Ala Met Asp Asn
1 5 10

<210> 136
<211> 10
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-H3 VARIANT 1

<400> 136

Asp Gly Arg Tyr Pro Tyr Ala Met Asp Asn
1 5 10

<210> 137
<211> 10

<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-H3 VARIANT 2

<400> 137

Asp Gly Tyr Tyr Pro Tyr Ala Met Lys Asn
1 5 10

<210> 138
<211> 10
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-H3 VARIANT 3

<400> 138

Asp Gly Arg Tyr Pro Tyr Ala Met Lys Asn
1 5 10

<210> 139
<211> 10
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-H3 VARIANT 4

<400> 139

Asp Gly Tyr Tyr Pro Tyr Ala Met Ser Asn
1 5 10

<210> 140
<211> 10
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-H3 VARIANT 5

<400> 140

Asp Gly Tyr Tyr Pro Tyr Ala Met Ala Asn
1 5 10

<210> 141
<211> 10
<212> PRT
<213> ARTIFICIAL

<220>
<223> CDR-H3 VARIANT 6

<400> 141

Asp Gly Tyr Tyr Pro Tyr Ala Leu Asp Asn
1 5 10

<210> 142

<211> 112
<212> PRT
<213> ARTIFICIAL

<220>
<223> VARIABLE LIGHT CHAIN OF CL-89

<400> 142

Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ser Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys Arg Ala Ser Lys Ser Val Asp Ser Tyr
20 25 30

Gly Asn Ser Phe Met His Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro
35 40 45

Lys Leu Leu Ile Tyr Leu Ala Ser Asn Leu Glu Ser Gly Val Pro Asp
50 55 60

Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser
65 70 75 80

Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln Asn Asn
85 90 95

Glu Asp Pro Arg Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg
100 105 110

<210> 143
<211> 118
<212> PRT
<213> ARTIFICIAL

<220>
<223> VARIABLE HEAVY CHAIN CL-276G

<400> 143

Gln Val Thr Leu Arg Glu Ser Gly Pro Ala Leu Val Lys Pro Thr Gln
1 5 10 15

Thr Leu Thr Leu Thr Cys Thr Val Ser Gly Phe Ser Leu Ser Ala Tyr
20 25 30

Ser Val Asn Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu Trp Leu
35 40 45

Ala Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Lys
50 55 60

Ser Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu
65 70 75 80

Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala
85 90 95

Gly Asp Gly Tyr Tyr Pro Tyr Ala Met Asp Asn Trp Gly Gln Gly Ser
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 144
<211> 112
<212> PRT
<213> ARTIFICIAL

<220>
<223> VARIABLE LIGHT CHAIN OF RL-36

<400> 144

Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ser Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys Arg Ala Ser Lys Ser Val Asp Ser Tyr
20 25 30

Gly Asn Ser Phe Met His Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro
35 40 45

Lys Leu Leu Ile Tyr Leu Ala Ser Asn Leu Glu Ser Gly Val Pro Asp
50 55 60

Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser
65 70 75 80

Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln Asn Asn
85 90 95

Glu Asp Pro Arg Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg
100 105 110

<210> 145
<211> 118
<212> PRT
<213> ARTIFICIAL

<220>
<223> VARIABLE HEAVY CHAIN RL-36

<400> 145

Gln Val Thr Leu Arg Glu Ser Gly Pro Ala Leu Val Lys Pro Thr Gln
1 5 10 15

Thr Leu Thr Leu Thr Cys Thr Gly Ser Gly Phe Ser Leu Ser Ala Tyr
20 25 30

Ser Val Asn Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu Trp Leu
35 40 45

Ala Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Lys
50 55 60

Ser Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu
65 70 75 80

Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala
85 90 95

Val Asp Gly Tyr Tyr Pro Tyr Ala Met Asp Asn Trp Gly Gln Gly Ser
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 146
<211> 118
<212> PRT
<213> ARTIFICIAL

<220>
<223> VARIABLE HEAVY CHAIN RL-19

<400> 146

Gln Val Thr Leu Arg Glu Ser Gly Pro Ala Leu Val Lys Pro Thr Gln
1 5 10 15

Thr Leu Thr Leu Thr Cys Thr Ser Ser Gly Phe Ser Leu Ser Ala Tyr
20 25 30

Ser Val Asn Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu Trp Leu
35 40 45

Ala Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Lys
50 55 60

Ser Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu
65 70 75 80

Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala
85 90 95

Leu Asp Gly Tyr Tyr Pro Tyr Ala Met Asp Asn Trp Gly Gln Gly Ser
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 147
<211> 118
<212> PRT
<213> ARTIFICIAL

<220>

<223> VARIABLE HEAVY CHAIN RL-11

<400> 147

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Gln Val Thr Leu Arg Glu Ser Gly Pro Ala Leu Val Lys Pro Thr Gln
1               5                   10                  15

Thr Leu Thr Leu Thr Cys Thr Thr Ser Gly Phe Ser Leu Ser Ala Tyr
            20                  25                  30

Ser Val Asn Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu Trp Leu
        35                  40                  45

Ala Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Lys
    50                  55                  60

Ser Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu
65                  70                  75                  80

Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala
                85                  90                  95

Val Asp Gly Tyr Tyr Pro Tyr Ala Met Asp Asn Trp Gly Gln Gly Ser
            100                 105                 110

Leu Val Thr Val Ser Ser
        115
```

<210> 148
<211> 118
<212> PRT
<213> ARTIFICIAL

<220>
<223> VARIABLE HEAVY CHAIN RL-8

<400> 148

```
Gln Val Thr Leu Arg Glu Ser Gly Pro Ala Leu Val Lys Pro Thr Gln
1               5                   10                  15

Thr Leu Thr Leu Thr Cys Thr Leu Ser Gly Phe Ser Leu Ser Ala Tyr
            20                  25                  30

Ser Val Asn Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu Trp Leu
        35                  40                  45

Ala Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Lys
    50                  55                  60

Ser Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu
65                  70                  75                  80

Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala
                85                  90                  95
```

```
Ser Asp Gly Tyr Tyr Pro Tyr Ala Met Asp Asn Trp Gly Gln Gly Ser
            100                 105                 110

Leu Val Thr Val Ser Ser
        115

<210>  149
<211>  118
<212>  PRT
<213>  ARTIFICIAL

<220>
<223>  VARIABLE HEAVY CHAIN RL-45

<400>  149

Gln Val Thr Leu Arg Glu Ser Gly Pro Ala Leu Val Lys Pro Thr Gln
1               5                   10                  15

Thr Leu Thr Leu Thr Cys Thr Thr Ser Gly Phe Ser Leu Ser Ala Tyr
            20                  25                  30

Ser Val Asn Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu Trp Leu
        35                  40                  45

Ala Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Lys
    50                  55                  60

Ser Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu
65                  70                  75                  80

Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala
                85                  90                  95

Thr Asp Gly Tyr Tyr Pro Tyr Ala Met Asp Asn Trp Gly Gln Gly Ser
            100                 105                 110

Leu Val Thr Val Ser Ser
        115

<210>  150
<211>  112
<212>  PRT
<213>  ARTIFICIAL

<220>
<223>  VARIABLE LIGHT CHAIN RL-36-L1,59

<400>  150

Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ser Val Ser Leu Gly
1               5                   10                  15

Glu Arg Ala Thr Ile Asn Cys Arg Ala Ser Lys Ser Val Asp Ser Tyr
            20                  25                  30
```

```
Gly Gln Ser Phe Met His Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro
        35                  40                  45

Lys Leu Leu Ile Tyr Leu Ala Ser Asn Leu Glu Ser Gly Val Pro Asp
    50                  55                  60

Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser
65                  70                  75                  80

Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln Asn Asn
                85                  90                  95

Glu Asp Pro Arg Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg
            100                 105                 110
```

<210> 151
<211> 118
<212> PRT
<213> ARTIFICIAL

<220>
<223> VARIABLE HEAVY CHAIN RL36-L1,59

<400> 151

```
Gln Val Thr Leu Arg Glu Ser Gly Pro Ala Leu Val Lys Pro Thr Gln
1               5                   10                  15

Thr Leu Thr Leu Thr Cys Thr Gly Ser Gly Phe Ser Leu Ser Ala Tyr
            20                  25                  30

Ser Val Asn Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu Trp Leu
        35                  40                  45

Ala Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Lys
    50                  55                  60

Ser Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu
65                  70                  75                  80

Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala
                85                  90                  95

Val Asp Gly Tyr Tyr Pro Tyr Ala Met Asp Asn Trp Gly Gln Gly Ser
            100                 105                 110

Leu Val Thr Val Ser Ser
        115
```

<210> 152
<211> 248
<212> PRT
<213> ARTIFICIAL

<220>
<223> SINGLE CHAIN FV

<400> 152

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Gln Val Thr Leu Arg Glu Ser Gly Pro Ala Leu Val Lys Pro Thr Gln
1               5                  10                  15

Thr Leu Thr Leu Thr Cys Thr Val Ser Gly Phe Ser Leu Ser Ala Tyr
            20                  25                  30

Ser Val Asn Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu Trp Leu
        35                  40                  45

Ala Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Lys
    50                  55                  60

Ser Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu
65                  70                  75                  80

Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala
                85                  90                  95

Gly Asp Gly Tyr Tyr Pro Tyr Ala Met Asp Asn Trp Gly Gln Gly Ser
            100                 105                 110

Leu Val Thr Val Ser Ser Gly Gly Ser Ser Arg Ser Ser Ser Ser Gly
        115                 120                 125

Gly Gly Gly Ser Gly Gly Gly Gly Asp Ile Val Met Thr Gln Ser Pro
    130                 135                 140

Asp Ser Leu Ser Val Ser Leu Gly Glu Arg Ala Thr Ile Asn Cys Arg
145                 150                 155                 160

Ala Ser Lys Ser Val Asp Ser Tyr Gly Asn Ser Phe Met His Trp Tyr
                165                 170                 175

Gln Gln Lys Pro Gly Gln Pro Pro Lys Leu Leu Ile Tyr Leu Ala Ser
            180                 185                 190

Asn Leu Glu Ser Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly
        195                 200                 205

Thr Asp Phe Thr Leu Thr Ile Ser Ser Val Gln Ala Glu Asp Val Ala
    210                 215                 220

Val Tyr Tyr Cys Gln Gln Asn Asn Glu Asp Pro Arg Thr Phe Gly Gly
225                 230                 235                 240

Gly Thr Lys Val Glu Ile Lys Arg
                245
```